

REEL # 32  
STEPANOV, K.N.

UDC 533.951.8

USSR

PYATAK, A. I., SIZONENKO, V. L., and STEPANOV, K. N.

"Nonpotential Instabilities of Plasmas With Transverse Current, Part 2"

Leningrad, Zhurnal Tekhnicheskoy Fiziki, No 3, 1973, pp 483-488

Abstract: This article is the second part of a paper begun in the same issue of the same journal named above (pp 475-482). This second part is concerned with short-wave, nonpotential instabilities in a plasma with a transverse current and considers the excitation of nonpotential oscillations in a non-isothermal plasma with hot electrons and cold ions as well as similar situations in an isothermal plasma. It is shown that if the electron temperature is much higher than the ion temperature, long-wave electromagnetic oscillations with a phase velocity of the order of the electron thermal velocity along the magnetic field may be generated in addition to short-wave ionic-sonic oscillations. The instabilities in a plasma whose electron temperature substantially exceeds the ion temperature are investigated, as well as those in a plasma of equal electron and ion temperatures. The authors note that the unstable oscillations excited by resonance particles also are important factors in heating the plasma electrons and ions.

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PYATAK, A. I., SIZONENKO, V. L., and STEPANOV, K. N.

"Nonpotential Instabilities of Plasmas With Transverse Current, Part 1"

Leningrad, Zhurnal Tekhnicheskoy Fiziki, No 3, 1973, pp 475-482

Abstract: Plasmas with a current flowing at right angles to the external magnetic field are unstable with respect to the oscillation of high-frequency, small-scale instabilities with frequency and increments of build-up higher than the ion cyclotron frequency. This paper discusses the excitation of short-wave, nonpotential oscillations in such a plasma. It is assumed that the frequencies and increments of build-up of the oscillations are higher than the ion cyclotron frequency and are much lower than the electron cyclotron frequency, while the transverse wavelength is assumed much shorter than the Larmor ion radius. The effect of the magnetic field on the ions during the development of the instabilities can then be neglected. The further assumption is made that the transverse wavelength is much less than the characteristic dimensions of the nonuniformity of density and the magnetic field, which condition permits a local approximation of the problem. Hydrodynamic and hot-ion instabilities in the plasma are also investigated. The authors express their gratitude to A. B. Mikhaylovskiy for his critique and advice.

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UDC: 539.351.8

USSR

YEGORENKOV, V. D., et al, Zhurnal Tekhnicheskoy Fiziki, No 2, 1973,  
pp 270-275

for the dielectric permeability. The authors express their grati-  
tude to A. I. Pyatak for his comments and useful advice.

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UDC: 533.951

USSR

KALADZE, T. D., LOMINADZE, D. G., and STEPANOV, K. N.

"Investigating Cyclotron Wave Dispersion in a Plasma"

Leningrad, Zhurnal Tekhnicheskoy Fiziki, No 2, 1972, pp 243-252

Abstract: An analysis is made of the dispersion equations of cyclotron waves propagated in a plasma perpendicular to the magnetic field. Especial attention is devoted to an analysis of the cases which do not lend themselves to simple analytic operations. Dispersion equations are obtained for high-numbered harmonics in the short-wave limit, and simple analytic expressions are found for the frequency of cyclotron waves in several limiting cases. A numerical analysis is made of the dispersion equations which fully represent the dispersion of plasma cyclotron waves. In the analyses, relativistic effects were ignored. The authors are associated with the Institute of Applied Mathematics, Tbilisi State University, Physico-technical Institute of the Ukrainian SSR Academy of Sciences at Kharkov.

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UDC 533.916

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ROZHKOV, A. M., STEPANOV, K. N., SUPRUNENKO, V. A., FARENIEK, V. I.

"Investigating the Excitation of Ion-Cyclotron Oscillations in a Plasma in Crossed Electric and Magnetic Fields"

Kiev, Fizika plazmy i problemy upravlyayemogo termovadernogo sinteza, 1971, Naukova dumka, pp 14-18

Abstract: A description is given of experiments detecting unstable ion-cyclotron oscillations with a frequency of the order of the plasma rotational velocity. As a result of the development of the oscillations, high-energy ions with an energy of the order of 1 keV and a velocity direction along the magnetic field appear. The longitudinal and transverse wavelengths of the cyclotron oscillations are of the order of 1 cm. At the beginning of the instability development, when the Larmor radius of the ions is much less than the radius of the plasma cylinder, the oscillations can be identified as longitudinal cyclotron with a phase velocity along the magnetic field much less than the electron thermal velocity.

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USSR

ROZHKOV, A. M. et al, Fizika plazmy i problemy upravlyayemogo termoyadernogo sinteza, 1971, Naukova dumka; pp 14-15

As the plasma heats up due to the increasing instability, the Larmor radius increases to the point where it is commensurate with the system dimensions. A diagram of the experimental setup is presented along with an explanation of its operation. The authors suggest that study of this new type of plasma instability may be useful for understanding experimental results in the heating of the ionic plasma component, in which the radial electric field is either created deliberately or is spontaneously generated.

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UDC 533.951

USSR

DEMCHENKO, V. V. and STEPANOV, K. N.

"Nonstationary Phenomena During the Excitation of Low-Frequency Oscillations in a Plasma Cylinder"

Leningrad, Zhurnal Tekhnicheskoy Fiziki, Vol XLI, No 8, 1971, pp 1755-1758

Abstract: The present article is an investigation of the non-stationary processes of excitation of slowly decaying Alfvén waves (ionic-cyclotron waves) and rapid magneto-sonic waves (helicon waves) that occur in an infinite plasma cylinder when external currents are switched on in a finite-length coil that has been put on the cylinder. It was established that when the external currents have the form of a traveling wave, the following three types of oscillations occur in the plasma under the coil:

- 1) purely forced oscillations whose frequency and wave vector coincide with those of the external currents;
- 2) natural oscillations whose frequency and damping constant coincide with the natural frequency and damping constant of the natural oscillations of the plasma cylinder. Their wave vector is that of the external currents. These oscillations die down as  $t \rightarrow \infty$ ;

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DEMCHENKO, V. V. and STEPANOV, K. N., Zhurnal Tekhnicheskoy Fiziki, Vol XLI, No 8, 1971, pp 1755-1758

3) Natural oscillations which do not die down as time passes. Their axial wave number and attenuation factor coincide with those of the natural oscillations of the plasma, and their frequency is equal to the frequency of the external currents. These oscillations represent a superposition of the waves traveling parallel to and antiparallel to the magnetic field, and their amplitudes subside upon withdrawal from the ends of the coil. When the damping is sufficiently great or the coil is sufficiently long, their amplitudes are exponentially small, and these oscillations may be ignored.

The article concludes by pointing out how the results may be extended to the case of external currents of an arbitrary form.

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Magnetohydrodynamics

USSR

UDC 533.9

POKROYEV, A. G. and STEPANOV, K. N., Physical-Technical Institute of the Ukrainian Academy of Sciences, Kharkov State University imeni A. M. Gorkiy

"Nonlinear Propagation Theory of Electromagnetic Waves in Plasma Near Hybrid Resonance Frequencies"

Kiev, Ukrainskiy Fizicheskiy Zhurnal, Vol 16, No. 10, Oct 71, pp 1658-1663

Abstract: High frequency potentials appearing in plasma in which an e.m. wave is propagating produce changes in the electron and ion particle densities and consequently, in the magnitude of the dielectric constant, which becomes dependent on the wave amplitude. Space variation of the wave amplitude at a frequency near one of the hybrid resonance frequencies in a magnetoactive plasma was investigated. High-frequency wave potentials and space dispersion of plasma due to thermal motion of electrons were taken into account during the investigation.

The following further assumptions were made as the basis for the investigation: amplitude variation took place along a line at an angle to the external magnetic field; the value of the amplitude was sufficiently low to permit neglecting electromagnetic pressure in comparison to the gas-kinetic pressure; the phase velocity of the wave was much higher than the  $1/2$

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POKROMEV, A. G. and STEPANOV, K. N., Ukrainskiy Fizicheskiy Zhurnal,  
Vol 16, No 10, Oct 71, pp 1658-1663

thermal velocity of electrons.

It was found that with the thermal drift of electrons being accounted for, and for a longitudinal wave, both periodic and exponential solutions of the equations were possible, which situation indicated that in a magnetically active plasma subjected to thermal dispersion, nonlinear standing waves were possible. Solutions in the form of periodic functions only were obtained if space dispersion of plasma was neglected.

Solutions presented in the current paper may also be applied to the description of traveling electromagnetic waves if their phase velocities are well above their critical values.

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USSR

UDC 533.916

KALADZE, T. D., LOMINADZE, D. G., and STEPANOV, K. N., Scientific Research Institute of Applied Mathematics of Tbilisi State University, Institute of Physics of the Academy of Sciences Georgian SSR, Tbilisi, Physicotechnical Institute of the Academy of Sciences Ukrainian SSR, Khar'kov

"Study of Plasma Ion-Cyclotron Oscillation Spectra"

Kiev, Ukrainskiy Fizicheskiy Zhurnal, Vol 16, No 3, Mar 71, pp 469-473

Abstract: The article describes results of the numerical solution of a dispersion equation for potential and nonpotential ion-cyclotron oscillations in a low-frequency plasma, as well as giving analytic solutions in the limiting case of a strongly non-isothermal plasma. The dispersion equation of low-pressure plasma ion-cyclotron oscillations ( $4\pi n_0 T_\alpha / H_0^2 \ll 1$ ) takes the form

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KALAIZE, T. D., et al., Ukrainskiy Fizicheskiy Zhurnal, Vol 16,  
No 3, Mar 71, pp 469-473

$$1 + (T_i/T_e)/(1 - \xi) = f(\omega),$$

where

$$f(\omega) = e^{-\mu} \left[ I_0(\mu) + 2 \sum_{n=1}^{\infty} \frac{\omega^2}{\omega^2 - n^2 \omega_{Hi}^2} I_n(\mu) \right],$$

$$\xi = (T_i/T_e) (\omega^2/\omega_{Hi}^2) \beta/\mu^2,$$

$$\beta = \kappa/\cos^2 \Theta, \quad \kappa = 4\pi n_0 T_i/H_0^2,$$

$$\mu = k^2 v_{Ti}^2/\omega_{Hi}^2 = k^2 \varrho_i^2,$$

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KALADZE, T. D., et al., Ukrainskiy Fizicheskiy Zhurnal, Vol 16, No 3, Mar 71, pp 469-473

$n_0$  is the plasma density,  $H_0$  the external magnetic field strength,  $I_n(\mu)$  modified Bessel function,  $\omega_{Hi} = \frac{eH_0}{m_i c}$  the ion cyclotron frequency,  $v_{Ti} = (T_i/m_i)^{1/2}$  the ion thermal velocity,  $\Theta$  the angle between the magnetic field and wave vector,  $\rho_i = v_{Ti}/\omega_{Hi}$  Larmor ion radius. A BESM-4 computer was used for the numerical solution of the dispersion equation for different values of the parameters  $\alpha = T_i/T_e$  and  $\beta = 4\pi n_0 T_i / H_0^2 \cos^2 \Theta$ . Graphs for the natural frequencies  $\omega =$

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KALADZE, T. D., et al., Ukrainskiy Fizicheskiy Zhurnal, Vol 16, No 3, Mar 71, pp 469-473

$\omega_n(R)$  for parameter  $\beta$  values equal to 0, 0.1, 0.3, 1, 3, and 10 indicate that the maximum value of the natural oscillation frequency  $\omega_n(R)$  ( $\omega_n < n\omega_{Hi}$ ) increasingly approximates the frequency  $n\omega_{Hi}$  with a decrease in the ratio  $T_i/T_e$ .

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USSR

STEPANOV, K. N.; SIZONENKO, V. L. (Physicotechnical Institute of the Ukrainian Academy of Sciences, Khar'kov)

"Instability of a Plasma with a Current in a Magnetic Field"

Kiev, Ukrainskiy Fizicheskiy Zhurnal; March, 1971; pp 438-45

ABSTRACT: The article deals with the excitation of short-wave, ionic cyclotron plasma oscillations with a wavelength which is considerably less than the Larmor radius of ions  $\rho_i$  by electrons drifting under the electrical field effect along the magnetic field with a velocity less than the electron heat velocity. It is shown that the frequency of such oscillations, which is within the range  $n\omega_{Hi} < \omega_k < (n+1)\omega_{Hi}$ , for  $n \sim k\rho_i \gg 1$ , can not be close to a frequency which is a multiple of the ionic cyclotron frequency  $\omega_{Hi}$  ( $k$  is the wave vector). That is why cyclotron damping of such oscillations is small and they can be easily excited by drift electrons.

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USSR

STEPANOV, K. N.; SIZONENKO, V. L. (Khar'kov State University im. A. M. Gor'kogo; Physicotechnical Institute of the Ukrainian Academy of Sciences, Khar'kov)

"Anomalous Resistance of a Plasma in a Strong Magnetic Field"

Kiev, Ukrainskiy Fizicheskiy Zhurnal; March, 1971; pp 429-37

ABSTRACT: The authors consider the anomalous resistance and turbulent heating of a strongly nonisothermic ( $T_e \gg T_i$ ) plasma in a strong magnetic field ( $\omega_{He} \gg \omega_{pe}$ ) which are caused by electron scattering by "beats" of ion-sound turbulent pulsations. The level of turbulent noises is evaluated from the condition that stabilization of ion-sound instability starts when resonance electrons responsible for the build-up of oscillations are knocked out under the effect of oscillation from resonance in phase with the oscillation period of the wave. In this case, the electron velocity  $u_e$  in the external field  $E$  is shown to be equal to

$$u_e = v_{Te} (eE/n_e v_{Te} \omega_{pi})^{1/2},$$

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STEPANOV, K. N., et al., Ukrainskiy Fizicheskiy Zhurnal, Mar 71,  
pp 429-437

where  $v_{Te} = (T_e/m_e)^{1/2}$  : i.e.,  $u_e$  is practically independent of  $E$ . It also follows that the plasma resistivity is nearly proportional to  $Z$ . This ratio is in good quantitative agreement with the results of experiments on the "Tokomak" TM-3.

Data on the rates of electron and ion heating of the plasma are evaluated, and it is shown that the ions heat up considerably faster than the electrons.

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Acc. Nr: AP0038026

Ref. Code: UR 0056

PRIMARY SOURCE: Zhurnal Eksperimental'noy i Teoreticheskoy  
Fiziki, 1970, Vol 58, Nr 1, pp 45-50

INVESTIGATION OF PLASMA INSTABILITY IN A STRONG  
ALTERNATING ELECTRIC FIELD

Grigor'eva, L. I.; Smerdov, B. I.; ~~Stamirov, K. N.~~  
Chechkin, V. V.

The frequency spectrum is obtained for the previously discovered high frequency small-scale instability excited in a plasma by a high amplitude fast magnetosonic wave. The dependence of noise amplitude on field strength of the wave is investigated and it is shown that the dependence is of the threshold type.

REEL/FRAME  
19731067

21

UDC 933.916

USSR

YEGORENKOV, V. D. and STEPANOV, K. N., Physicotechnical Institute of the Academy of Sciences UkrSSR, Khatkov, Sukhumi Physicotechnical Institute

"Stability of a Plasma With Finite Pressure and an Anisotropic Electron Velocity Distribution"

Kiev, Ukrainskiy Fizicheskiy Zhurnal, Vol. 15, No. 2, Feb 70, pp 325-330

Abstract: The stability of a strongly nonisothermal ( $T_e \gg T_i$ ) plasma with finite pressure and anisotropic electron velocity distribution is investigated. It is shown that the Alfvén and fast magnetosonic branches of the oscillations are unstable in the high-frequency region ( $\omega_{He} \gg |\omega| \gg \omega_{Hi}$ ), and the instability region in this frequency range coincides with the instability region for  $|\omega| < \omega_{Hi}$ . It was assumed in the treatment that the oscillations have a phase velocity along the magnetic field considerably greater than the thermal velocities of electrons but considerably less than the thermal velocity of ions and the wavelength is considerably greater than the Larmor radius of the ions. Analysis shows that the existence of instability in the area of frequencies considerably greater than the ion cyclotron frequency is possible in an anisotropic

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YEGORENKO, V. D. and STEPANOV, K. N., Ukrainskiy fizicheskiy zhurnal, Vol. 15, No. 2, Feb 70, pp 325-330

plasma of finite pressure with hot electrons and cold ions. The unstable oscillations in the isotropic case correspond to whistles and nonmagnetized ion-sound oscillations. Since the growth rate of these instabilities is great, this instability is more dangerous than low-frequency diamagnetic and centrifugal instabilities.

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USSR

GALEYEV, A. A., LOMINADZE, D. G., PATARAYA, A. D., SAGDEYEV, R. Z., and  
STEPANOV, K. N., Institute of High-Temperature Physics of the Academy of  
Sciences USSR

"Anomalous Resistance of Plasma Due to Instability at Cyclotron Harmonics"

Moscow, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 15,  
No 7, 5 Apr 72, pp 417-420

Abstract: An expression for the anomalous resistance arising due to buildup of Bernstein modes is obtained and the nonlinear mechanism leading to saturation of the growth of oscillations is explained. It is noted that high anomalous resistance of plasma observed in many experiments is associated with the appearance of ion-sound instability; but that ion-sound instability can arise only for sufficiently strong nonisothermality  $T_e \gg T_i$ , and the anomalous resistance occurs when this condition is not fulfilled. It is observed that instability in electron cyclotron oscillations (Bernstein modes) has recently been discussed in connection with the problem of anomalous resistance; Bernstein modes are oscillations with the wave vector strictly or almost strictly perpendicular to the magnetic field and with frequencies of the order  $\omega_{he}$ . As distinct from ion-sound, this instability

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GALEYEV, A. A., et al., Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 15, No 7, 5 Apr 72, pp 417-420

develops from  $T_i \geq T_e$ . An expression is obtained for  $\nu_{eff}$ , the frequency of the oscillations at which electrons are scattered. The magnitude of  $\nu_{eff}$  is small due to the "Pitayevskiy factor"  $\kappa_p^2$ . The resistance given by this expression is much less than the resistance due to ion-sound instability. It is stated that when electron-sound instability due to smallness of the increment of rise cannot develop and goes into a nonlinear mode such as in collisionless shock waves, this anomalous resistance in Bernstein modes will play the major role.

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USSR

UDC 533.916

ROZHKOV, A. M., STEPANOV, K. N., SUPRUNENKO, V. A., FARENIK, V. I.,  
VLASOV, V. V.

"Resonance Cyclotron Instability in a Rotating Plasma"

Fiz. plazmy i probl. upravl. termoyader. sinteza. Resp. mezhved. sb.  
(Plasma Physics and Problems of the Controlled Thermonuclear Fusion.  
Republic Interdepartmental Collection), 1972, No. 3, pp 193-202 (from  
RZh-Fizika, No 11, Nov 72, Abstract No 11G178)

Translation: Resonance excitation of ion-cyclotron oscillations in a plasma in crossed electric and magnetic fields was investigated experimentally. It was shown that if the frequency of the drift rotation of a plasma cloud in crossed fields is a multiple of the gyrofrequency of the ions, a resonance cyclotron instability develops in the discharge which is accompanied by continuous generation of ion-cyclotron oscillations of high amplitude, due to the energy of the external source of direct current. The increment of this instability is on the order of the gyrofrequency of the ions.

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STEPANOV, L. N.

DETERMINING VOLATILE WATER-SOLUBLE ORGANIC COMPOUNDS IN PRESSURIZED CREAMERS

[Article by L. N. Stepanov and A. P. Tereshchenko; Moscow, Krasnitskaya Biologiya i Meditsina, vol. 6, no. 1, pp. 88-91, 1972, submitted for publication 3 April 1970]

JPRS 55687  
DOC 613.15202:27

In a number of cases it is desirable to determine the composition of volatile water-soluble organic substances in the vapor-gas phase by analyzing the corresponding substances in the fluid in equilibrium with steam. Thus, an analysis of the composition of the condensate of atmospheric moisture in an enclosed pressurized chamber can be used for determining the concentration of these substances in the gas phase. On the other hand, by knowing the coefficient of the phase distribution of substances in the fluid-vapor system it is possible to determine their concentration in the liquid phase using data from an analysis of the gas medium. This is particularly important, for example, in monitoring the technical processes in systems for regenerating water, cultivating unicellular algae, etc.

A study of dilute aqueous solutions for mixtures of substances, such as acetone, acetaldehyde, methanol, ethanol, isopropanol and propanol in concentrations of  $10^{-6}$ - $10^{-3}$  mol (Yu. V. Pepelyayev, et al.) is of practical interest. Data on the phase equilibrium of these substances are available in the literature only for a concentration  $10^{-2}$  M (V. B. Kogan, et al.). Since the coefficient of liquid-vapor distribution may differ for different concentrations of organic substances in an aqueous solution (V. B. Kogan, et al., Gorskopf), it was desirable to determine these parameters applicable to highly dilute solutions.

Existing classical methods for investigating phase equilibrium -- single evaporation, circulation and dynamic methods (V. B. Kogan, et al.) -- are ill-suited for this purpose. Apparatus with a gas chromatography end of the analysis are also inapplicable. Some of them are complex, time consuming in use and require the availability of additional apparatus (vacuum equipment) and constants (L. S. Kolman, et al.). Others provide for a large volume of the sample and a long time for the settling-in of equilibrium (Nikheerle and Hala; Ye. G. Komarova and V. B. Kogan).



1/2 009 UNCLASSIFIED PROCESSING DATE--20NOV70  
TITLE--APPARATUS FOR ADMITTING A SAMPLE INTO A CHROMATOGRAPH -U-  
AUTHOR--(02)--STEPANOV, L.N., TERESHCHENKO, A.P.  
COUNTRY OF INFO--USSR S  
SOURCE--ZAVOD. LAB. 1970, 36(3), 371-2  
DATE PUBLISHED-----70  
  
SUBJECT AREAS--CHEMISTRY  
TOPIC TAGS--AQUEOUS SOLUTION, CHEMICAL ANALYSIS, GAS CHROMATOGRAPHY,  
CHEMICAL LABORATORY APPARATUS  
  
CENTRAL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--3005/1388 STEP NO--UR/0032/70/036/003/0371/0372  
CIRC ACCESSION NO--AP0133340  
UNCLASSIFIED

2/2 009

UNCLASSIFIED

PROCESSING DATE--20NOV70

CIRC ACCESSION NO--AP0133340

ABSTRACT/EXTRACT--(U) GP-C- ABSTRACT. AQ. SOLNS. OF VOLATILE COMPOS. (MECHG, ME SUB2 CO, MECH, ISO PROH, ETOH, AND PROH) WERE ANALYZED BY DETN. OF THE COMPN. OF THE VAPOR PHASE ABOVE THE LIQ. THE APP. AND THE WORKING CONDITIONS OF GAS CHROMATOG. WERE DESCRIBED BY YU. V. PEPELYAEV, L. N. STEPANOV, AND A. P. TERESHCHENK (1969). THE SAMPLING OF THE VAPOR PHASE AND ITS INJECTION ON COLUMNS WAS CARRIED OUT BY CIRCULATION EQUIPMENT WITH A PARALLELY CONNECTED PUMP. THE ANAL. TAKES 40 MIN; THE ERROR IS LOWER THAN TY THE INTRODUCTION OF SAMPLES WITH AN INJECTOR. FACILITY: INST. MED.-BIOL. PROBL., MOSCOW, USSR.

UNCLASSIFIED

STEPANOV, L. N.

JPRS 57517  
15 Nov 72

- 107 -

GAS CHROMATOGRAPHIC INVESTIGATIONS OF VOLATILE PRODUCTS OF HUMAN METABOLISM  
ACCOMPANYING REDUCED FOOD INTAKE AND STARVATION

UDC 616.333-082.5-008.7-074:541.724

[Article by V. P. Savina, L. N. Stepanov, N. L. Sokolov and V. G. Medvedev, *Kosmos*, Krasnaya Zvezda Publishing House, Vol. 8, No. 5, September-October 1972, pp. 67-69, submitted for publication 21 June 1971]

**Abstract:** This paper gives the results of comparative studies of volatile metabolites eliminated together with the urine, saliva and exhaled air by human subjects during prolonged starvation. It also presents data obtained by examining the gas-vapor phase of urine from human subjects kept on calorie-reduced diets. Changes in the content of ketones and alcohols were similar in all the three analyzed media. Changes of this type may develop in patients suffering from certain metabolic disorders. Accordingly, they can be used as an additional test during functional diagnosis of some diseases.

Study of the gaseous metabolites released by man during his vital functions and changes in the qualitative and quantitative composition of the excretions included in this complex under the influence of diet with a reduced caloric content and during starvation are of definite interest for clarifying the metabolic processes, diagnosis of different diseases and clarifying the influence of these metabolites on the processes of forming the bodily medium in pressurized, enclosed chambers.

It has been demonstrated in a number of studies that with impairment of fat or carbohydrate metabolism, particularly during diabetes, pregnancy, starvation, or an irregular food intake, the number of "ketone bodies" (β-oxobutyric acid, acetone, acetoacetic acid) in the urine, blood and exhaled air changes considerably (V. V. Kuzlov and N. A. Timov; D. D. Frenkel, Levey, et al.).

It was recently established that in addition to ketones the human body eliminates a number of other volatile compounds. A detailed investigation of the composition of exhaled air with the use of highly sensitive

Pathology

USSR

UDC 616.988.25-022.395.42-036.8-07:616.12-073.97

STEPANOV, M. A., YEVSEYEV, N. F., and KUZINA, Z. V., Chair of Functional  
Diagnosis and Chair of Medical Disability, Novokuznetsk Institute of Advanced  
Training of Physicians

"Condition of the Cardiovascular System in Persons With Remote Aftereffects  
of Tickborne Encephalitis"

Moscow, Terapevticheskiy Arkhiv, No 9, 1971, pp 95-98

Abstract: Clinical and EKG examination of 109 persons who had suffered from tickborne encephalitis 2 to 40 years before revealed a relationship between EKG shifts and severity of the neurologic sequelae of the disease. Most of the individuals exhibited moderate EKG shifts, chiefly in the T wave, heart rate (tachycardia, bradycardia, sinus arrhythmia), and conduction, but without evident clinical manifestation. In those with severe neurologic disturbances, pain of noncoronary character, and arterial hypertension, the EKG shifts were more pronounced, including signs of interventricular heart-block, persistent extrasystolic arrhythmia, and systolic overload of the left ventricle.

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USSR

UDC 632.95

STEPANOV, M. K., OSIPYAN, V. T., KAZHDAN, V. B., MASLIY, L. K., GRABOVSKIY, B. S., and DUNAYEVA, I. D.

"A Method of Controlling Fleas"

USSR Author's Certificate No 263328, filed 16 Mar 62, published 26 May 70  
(from RZh-Khimiya, No 3, 10 Feb 71, Abstract No 3N569)

Translation: Hexamethylenecarbamide (I) is proposed for use as a flea repellent. The substance is an oily, colorless, odorless liquid with a boiling point of 153°C/3 mm,  $d_4^{20}$  1.0489,  $n_D^{20}$  1.5161. Compound I is synthesized by bubbling  $\text{COCl}_2$  at 5-10°C through a solution of hexamethylene diamine in an appropriate solvent. The preparation is stable. In 30 days of storage under conditions of intense ventilation, 20-25 percent of compound I or less was volatilized.

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1/2 018 UNCLASSIFIED PROCESSING DATE--27NOV70  
TITLE--METHODS FOR COMBATTING FLEAS -U-  
AUTHOR-(05)-STEPANOV, M.K., OSIPYAN, T.V., KAZHDAN, V.B., MASLIY, L.K.,  
GRABOVSKIY, B.S.  
COUNTRY OF INFO--USSR S  
SOURCE--U.S.S.R. 263,328  
REFERENCE--OTKRYTIYA, IZDBRET., PROM. OBRAZTSY, TOVARNYE ZNAKI 1970, 47(7)  
DATE PUBLISHED--04FEB70  
SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES  
TOPIC TAGS--FLEA, INSECTICIDE, CHEMICAL PATENT, AMIDE  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAE--3002/1561 STEP NO--UR/0482/70/000/000/0000/0000  
CIRC ACCESSION NO--AA0128956  
UNCLASSIFIED

2/2 018  
CIRC ACCESSION NO--AA0128956  
ABSTRACT/EXTRACT--(U) GP-0-  
A FLEA REPELLENT.

UNCLASSIFIED

PROCESSING DATE--27NOV70

ABSTRACT. HEXAMETHYLENECARBAMIDE WAS USED AS

UNCLASSIFIED

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UDC 669.7.018:620.178.3

STEPNOV, M. N., and YEVSTRATOVA, S. P., Moscow Aviation Technological  
Institute

"Indirect Evaluation of Aluminum Alloy Fatigue Strength"

Moscow, Zavodskaya Laboratoriya, No 10, Oct 72, pp 1253-1257

Abstract: The relationships are presented for the maximum amplitude of stress and coefficient, characterizing the sensitivity of a material to the asymmetry of the stress cycle, to the static tensile strength, and average cycle stress. These relationships, in conjunction with the equation of the generalized fatigue curve, make it possible to compute the fatigue curve for strained aluminum alloys in symmetrical and asymmetrical stress cycles for variable bend and axial tension-compression as well as to describe the nature of the diagram of maximum amplitudes. 4 figures, 6 bibliographic references.

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USSR

UDC 621.791.039

ISHTYKOV, YU. V., Engineer, KOSTENKO, I. F., Engineer, STEPANOV, N. A., Technician, DAVYDOV, A. A., Technician

"Protective Chamber for Welding Circular Seams on Curvilinear Surfaces"

Moscow, Svarochnoye Proizvodstvo, No 3, Mar 72, p 43

Abstract: A protective telescopic chamber for welding circular seams on stationary objects is described. The chamber has passed prolonged tests and provides reliable protection in automatic welding circular seams, 50-200 mm in diameter, on objects of OT4 and VT20 steels with curvilinear surfaces. The chamber is equipped with two movable telescopically connected cylinders of diameters greater than the diameter of the seam to be welded. Stationary objects can be welded with this chamber by rotating the upper cylinder and welding head; rotating objects are welded by a stationary upper cylinder and torch. The use of the chamber for welding in an argon atmosphere with nonconsumable electrodes has proved to be economical and to provide high-quality circular welds on curved surfaces. 1 illustration  
1/1

Power

USSR

UDC 621.311.21.003(47+57)

STEPANOV, N. N.

"Economical Types of Hydroelectric Power Plant Buildings with Vertical Units Making up the Kiev and Kanev Hydroengineering Complexes"

Izv. vyssh. uchebn. zavedeniy. Str-vo i arkhitektura (News of the Higher Institutions of Learning. Construction and Architecture), 1970, No 10, pp 105-109 (from RZh-Elektrotehnika i Energetika, No 2, Feb 71, Abstract No 2 D74)

Translation: A technical-economic comparison of versions of hydroelectric power plants with horizontal capsule units and vertical units having a rectangular turbine chamber and a conical discharge tube with an insert is made in the examples of the Kiev and Kanev Hydroelectric Power Plants. The equipment efficiency and the generation of electric power are approximately the same in both versions. In the hydroelectric power plant buildings with vertical units, the volume of concrete operations is 13-18% higher, but the cost of hydraulic power and mechanical equipment is 7-13% lower. In sum, the total cost for the Kiev-Hydroelectric Power Plant is decreased by 7%, and for the Kanev Hydroelectric Power Plant, by 1.2%. There is 1 illustration, 1 table and a 7-entry bibliography.

1/1

UDC 533.95

USSR

STEPANOV, N. S., SOROKIN, YU. M., Gor'kiy State University imeni N. I. Lobachevskiy

"Kinetic Theory of Reflection of Electromagnetic Waves from a Moving Inhomogeneous Plasma Layer"

Leningrad, Zhurnal Tekhnicheskoy Fiziki, Vol XLII, No 3, 1972, pp 578-583

Abstract: A study was made of the reflection of electromagnetic waves from a layer of equilibrium plasma uniformly moving in a dielectric medium. The solution of the indicated problem can be expressed in terms of the solution for an auxiliary stationary plasma layer in a stationary dielectric and having a Maxwell distribution function. Expressions are presented for the coefficients of reflection and penetration of the waves through the layer. An expression uniquely relating the total energy and frequencies of the incident, reflected and transmitted signals was obtained for a weakly relativistic plasma. For moving boundaries it is not the coefficients of reflection and penetration of the waves with respect to power but the variation of the total energy of the corresponding signals considering the transformation of their duration which is more indicative. Relations are also obtained which permit the energy characteristics of the wave packet to be found for a cold plasma if their frequency characteristics are known.

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USSR

UDC 533.9.01

GAVRILENKO, V.G., LUPANOV, G.A., STEPANOV, N.S. [Gorkiy State University]

"Dynamo-Optical Effects In A Plasma"

Izv. VUZ: Radiofizika, Vol XV, No 2, Feb 1972, pp 183-190

Abstract: The propagation is considered of electromagnetic waves in an inhomogeneous moving cold electron plasma without an external magnetic field and collisions. Movement is assumed to be steady. Parts one and two of the paper -- "Tensor Of Dielectric Constant Of A Nonuniformly Moving Plasma" and "Propagation Of Waves In Slightly Inhomogeneous Medium -- consider waves in an isotropic plasma with parameters slowly variable in space, when it is possible to employ the approximations of geometrical optics. It is shown that in the case of a smooth change of the medium parameters, the beam trajectories are determined by the density distribution and the motion leads to rotation of the wave polarization plane. In part three -- "Passage Of Waves Through A Layer With A Constant Velocity Gradient" -- an example is presented of an exact solution of the problem for a layer with an arbitrarily rapid change of velocity; in this case, not only a rotation of the polarization plane of the propagating wave takes place, but also a change of the character of the polarization with reflection and refraction in the layer. 10 ref. Received by editors, 16 Apr 1971.

1/1

USSR

UDC 533.9.01

GAVRILENKO, V. G., LUPANOV, G. A., ~~STEPANOV, N. S.~~

"Dynamo-Optical Effects in a Plasma"

Gor'kiy, Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, Vol XV, No 2, 1972, pp 183-190

Abstract: A study was made of the propagation of electromagnetic waves in a nonuniformly moving cold electron plasma without an external magnetic field and collisions. The motion is assumed stationary. In the case of smooth variation of the parameters of the medium, the beam trajectories in the zero approximation of geometric optics are determined by the concentration distribution, and the motion leads to rotation of the polarization plane in the wave. For laminar flow with a constant velocity gradient, an exact solution of the equations was obtained which is a superposition of two independent waves elliptically polarized in opposite directions. The law of refraction of these waves was found, and the corresponding coefficients of reflection and penetration were calculated in the case of a layer of finite thickness. Formulas are found for the tensor of the dielectric constant of a nonuniformly moving plasma, wave propagation in a weakly inhomogeneous medium, and passage of waves through a layer with a constant velocity gradient.

1/1

USSR

UDC 669.293'295'296'297.017.11:537.312.62

IVANOV, O.S., RAYEVSKIY, I. I., and STEPANOV, N.V.

Sverkhprovodyashchiye splavy sistemy niobiy-titan-tsirkoniy-gafniy (Superconducting Alloys of the System Niobium-Titanium-Zirconium-Hafnium), Moscow, "Nauka" Press, 1971, 161 p., illustrations, bibliographic references, 1550 copies printed.

Translation of Annotation:

The monograph discusses a system based on decaying solid solutions of niobium. Data on the phase structure of two- and three-component alloys (as a part of the above quaternary system) as well as on their superconducting properties have been critically analyzed and correlated. Presented are the latest data on the phase structure of alloys produced by the authors and other investigators. Presented are, for the first time, the phase structure of the entire quaternary system Nb-Ti-Zr-Hf and the superconducting properties of this system. The effects of various factors (composition, structure, thermo-mechanical treatment) on changes in the critical parameters of binary, ternary, and more complex alloys are described. The book is intended for metal scientists, physical metallurgists, and other specialists engaged in the research, synthesis, and application of plastic superconducting materials.

Translation of Table of Contents:

Introduction  
1/3

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USSR

IVANOV, O.S., et al., Sverkhprovodyashchiye splavy sistemy niobiy-titan-tsirkoniy-gafniy, Moscow, "Nauka" Press, 1971.

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IVANOV, O.S., et al., Sverkhprovodyashchiye splavy sistemy niobiy-titan-tsirkoniy-gafniy, Moscow, "Nauka" Press, 1971.

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USSR

UDC: 621.397.61

LEBEDEV-KARMANOV, A. I., STEPANOV, N. V., FAYNSHTEYN, A. L.

"New High-Power Band III Transmitters at the Soviet-Wide Radio and Television Transmitting Station"

V sb. Televizion. tekhnika (Television Technology--collection of works), Moscow, "Svyaz", 1971, pp 266-302 (from RZh-Radiotekhnika, No 6, Jun 71, Abstract No 6G172)

Translation: The authors review the development of television transmitters in the Soviet Union from the thirties to the fifties. The peculiarities of construction of modern TV stations for the meter wave band are considered. The general characteristics of radio and television transmission equipment at the Ostankino telecenter are given. TV stations for band III with a power of 80/15 kW are described. Circuits of individual modules are presented, and the monitoring system and arrangement of the equipment at the center are described. Twenty-nine illustrations, bibliography of eight titles. N. S.

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USSR

STEPANOV, P. L., REBIN, A. M.

"One Model of Resource Control"

Kibernetika i vuz. [Cybernetics and the University -- Collection of Works],  
No 4, Tomsk, 1971, pp 155-159, (Translated from Referativnyy Zhurnal, Kiber-  
netika, No 3, 1972, Abstract No 3 V457 by D. E.).

Translation: Two levels of resource reserves are defined, making up a  
strategy of control for a model assuming that the demand for the resource  
stored is a stable random process.

1/1

Acc. Nr: **AP0035962**

Ref. Code: UR 0069

PRIMARY SOURCE: Kolloidnyy Zhurnal, 1970, Vol 32, Nr 1,  
pp 91-93

**STUDY OF ELECTRIC FLOTATION FOR ELECTROLYTE PURIFICATION  
OF ELECTROLYSIS PRODUCTS**

Matov, B. M.; Stepanov, P. M.; Prisyazhnyuk, B. L.; Grabois, B. A.  
*B. A. Grabois*

**Summary**

Removal of ferric hydroxide from electrolyte by electric flotation is possible only if hydrogen bubbles are used since oxygen has an adverse effect on flotation. The optimum conditions of the electric flotation process have been established.

*D.N.*

*18*

REEL/FRA

**19720703**

USSR

UDC 539.3

STEPANOV, R. D., Professor, Doctor of Technical Sciences, and BOGOMOL'NIY, V.M., Aspirant, Moscow Institute of Chemical Machine Building

"The Calculation of Multilayer Toroidal Shells"

Moscow, Izvestiya Vysshikh Uchebnykh Zavedeniy--Mashinostroyeniye, No 10, 1973, pp 5-9

Abstract: Consideration is given to the stress-deformed state of multilayer toroidal shells, specifically of a two-layer toroidal segment, in the presence of a deflecting load and internal pressure. This is the type of annular membranes, welded along the internal contour and the external contour, from which bellows of the "membrane" type are constructed. The results of calculation of the two-layer membrane are compared with experimental results. It is shown that the multilayer effect, consisting of a decrease of flexural rigidity, is manifested in the case of a number of layers not in excess of two or three. 3 figures. 2 references.

1/1

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USSR

UDC 615.12-001.28-02:[616.132+616.142]-008.6-07

YAKOVLEVA, L. A., STEPANOV, R. P., Laboratory of Radiation Cardiology of the Central Scientific Research Roentgenology and Radiology Institute, USSR Ministry of Health, Leningrad

"Changes in Coronary Vessels of Rabbits After Single Local Irradiation of the Cardiac Region"

Leningrad, Arkhiv Anatomii, Gistologii, i Embriologii, Vol 58, No 6, Jun 70, pp 66-69

Abstract: Chinchilla rabbits weighing 2.5-3.0 kg were irradiated in the cardiac region with a single 2,400 rad dose. Test animals were killed 10 days, 3 months, and 6 months after irradiation. The coronary vessels were filled with a 35% barium suspension in a 5% aqueous gelatin solution. Angiograms from the entire cardiac region were prepared. The diameters of the coronary rami were quantitatively determined. The most marked changes were observed 10 days after irradiation: a larger number of minute open vessels were noted in the myocardium, and the capillaries started to become congested with stasis; hemorrhages and dystrophic lesions were observed in the walls of medium-size and larger vessels. All these symptoms were less pronounced in animals examined 3 and 6 months after

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USSR

YAKOVLEVA, L. A., and STEPHANOV R. P., Arkhiv Anatomii, Gistologii, i Embriologii, Vol 58, No 6, Jun 70, pp 66-69

irradiation. Nevertheless, all data confirm that the injury of the vascular bed of the myocardium after irradiation appears to lead to the development of a pathological process.

2/2

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USSR

UDC: 621.373:530.145.6

VARGIN, V. V., KUZNETSOV, A. Ya., VEYNBERG, T. I., STEPANOV, S. A.,  
TSEKHOMSKIY, V. A.

"Ferromagnetic Glass"

USSR Author's Certificate No 267032, filed 17 Jan 64, published 16 Jul 70,  
(from RZh-Radiotekhnika, No 2, Feb 71, Abstract No 2D274 P)

Translation: This Author's Certificate introduces a ferromagnetic glass which includes  $\text{SiO}_2$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{CaO}$ ,  $\text{BaO}$ ,  $\text{ClO}$ ,  $\text{ZnO}$ ,  $\text{PbO}$ ,  $\text{TiO}_2$  and  $\text{Na}_2\text{O}$ . To increase the electrical resistance and softening temperature, the glass contains these components in the following amounts (mol.%):  $\text{SiO}_2$  40-60;  $\text{Fe}_2\text{O}_3$  7-20;  $\text{Al}_2\text{O}_3$  10-20;  $\text{CaO}$  up to 20;  $\text{BaO}$  up to 20;  $\text{ClO}$  up to 10;  $\text{ZnO}$  up to 10;  $\text{PbO}$  up to 10;  $\text{TiO}_2$  up to 10;  $\text{Na}_2\text{O}$  up to 20.

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UDC 620.193.43

USSR

STEPANOV, S. I., Central Scientific Research Institute of Ship-  
building Technology

"On the Character of the Destruction of Chromium-Nickel Steels  
and Alloys in Chloride Melts"

Moscow, Zashchita Metallov, Vol 7, No 1, Jan-Feb 71, pp 35-37

Abstract: Chromium-nickel steels and alloys in molten chlorides, in addition to general corrosion, undergo surface destruction which resembles intercrystalline corrosion and is due to selective dissolution of the chromium. The article gives data on the effect of the temperature of the molten salt ( $KCl$  and  $MgCl_2$ ) and the alloy composition on the degree of surface destruction. Even a slight ( $50^\circ$ ) increase in temperature significantly intensifies the surface destruction of steels  $Kh18Ni9Ti$  and  $Kh18Ni12Mo2Ti$ . Steel  $Kh18Ni9Ti$  and alloy  $KhNi78Ti$  experience more severe destruction in molten  $KCl$  than steels  $Kh25Ni20Cr2$ ,  $Kh18Ni14Mo2B$ , and  $1Kh14Ni18V2B$ .

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USSR

STEPANOV, S. I., Zashchita Metallov, Vol 7, No 1, Jan-Feb 71, pp 35-37

even with a shorter holding period. Steel Kh25N20S2 contains a significant amount of silicon, and steels Kh18Ni14M2B and 1Kh14Ni16V2B contain niobium. Alloying with silicon and niobium apparently may significantly increase the resistance of chromium-nickel steels in molten chlorides.

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UDC 531/534(09)

USSR

STEPANOV, T. YU.

"The Theory of Hydrodynamic Grids in the Papers of N. Ye. Zhukovskiy and S. A. Chaplygin and Its Subsequent Development"

Moscow, Mekhanika zhidkosti i gaza, No. 2, Mar/Apr 72, pp 3-8

Abstract: This survey article of the work of Zhukovskiy and Chaplygin commemorates the 125th anniversary of the birth of Zhukovskiy. This theory in current parlance has considered the flow of liquids and gases to spatial systems of fixed and moving blades of turbines. The importance of the theory of lattices is that practically all the energy which mankind expends is obtained with the aid of hydraulic or thermal turbines. The aerodynamics of a wing, and the theory of flow in a pipe and channel can also be considered as different limiting cases of the theory of lattices. The work of Euler can be considered the beginning of the hydrodynamic theory of turbines, where the hydraulic (one-dimensional, jet) theory of turbines was developed and a formula was obtained for the momentum which bears his name and the reaction of the liquid on the walls of a curved channel was calculated. The first two-dimensional hydrodynamics problems directly associated with turbines were formulated and solved in the works of N. Ye.

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USSR

STEPANOV, T. YU., Mekhanika zhidkosti i gaza, No. 2, Mar/Apr 72, pp 3-3

Zhukovskiy. In 1890 he proposed that the flow of a liquid through a turbine be over the surfaces of coaxial circular cylinders and carried out the development of one of these surfaces onto a plane. This approach is applied up until the present time in the theory of axial turbines. In 1914 he returned to a study of turbines in his vortex theory of a propeller. He still did not consider the flow here cylindrical but places into the flow behind the grid vortex surfaces converging from the edges of the blades. By assuming that the flow is axisymmetric he obtains from the equations of motion the distributions of the flow parameters along the radius which 40 years later became known as the laws of twist. At this time he also showed the validity of his theorem published in 1906 concerning the lift of a wing for a profile in a lattice if the arithmetic average of the velocity vectors at infinities ahead of and behind the lattice is taken as the flow velocity. In 1936 Zhukovskiy first formulated and solved the problem of a plane jet flow of an incompressible fluid over a lattice of plates. The essence of his method was to express the complex potential of the flow and the logarithm of the complex velocity (the Zhukovskiy function) in terms of a parametric variable that varies in the half-plane. S. A. Chaplygin somewhat refined his method and in 1930 he gave a complete solution for the problem of jet flow over a lattice of

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USSR

STEPANOV, T. 'U., Mekhanika zhidkosti i gaza, No. 2, Mar/Apr 72, pp 3-8

plates. The solution of this problem was first published abroad in 1931 by A. Betz and E. Peterson. Zhukovskiy published almost simultaneously with Chaplygin in 1914 and 1915 another solution to the problem of the flow around a lattice of plates. He describes an analogy with flow around a single plate and the complex velocity of the transverse and purely circulation flow over the lattice of plates formed by segments of one line and then obtains by a linear combination of these velocities with a constant velocity of the longitudinal flow any flow through the particular lattice. The first-two-dimensional problems in the theory of hydrodynamic lattices were first formulated and solved by Zhukovskiy and Chaplygin, who should be considered the founders of this theorem.

3/3

1/2 034 UNCLASSIFIED  
TITLE--AT THE OKEAN MANEUVERS -U-

PROCESSING DATE--18SEP70

AUTHOR--STEPANOV, V. S

COUNTRY OF INFO--USSR

SOURCE--PRAVDA UKRAINY, APRIL 23, 1970, P 4 COLS 1-5

DATE PUBLISHED--23APR70

SUBJECT AREAS--MILITARY SCIENCES, AERONAUTICS, MECH., IND., CIVIL AND  
MARINE ENGR

TOPIC TAGS--AMPHIBIAI AIRCRAFT, WAR GAMES, MILITARY TRAINING, BUOY,  
ANTISUBMARINE WARFARE, SUBMARINE DETECTION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAE--1985/0072

STEP NO--UR/9013/70/000/000/0004/0004

CIRC ACCESSION NO--AN0100631

UNCLASSIFIED

2/2 034

UNCLASSIFIED

PROCESSING DATE--18SEP70

CIRC ACCESSION NO--AN0100631

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. AMPHIBIAN AIRCRAFT PARTICIPATED IN ASW. DETECTION IS BY MEANS OF BUOYS DROPPED FROM THE AIRCRAFT AND ACT AS LISTENING DEVICES BY RADIO TRANSMISSION OF THE RADIO OPERATOR ON THE AMPHIBIAN. THE AMPHIBIAN MAY DROP TORPEDOES OR TRANSMIT INFORMATION ELSEWHERE. THE AMPHIBIAN PARTICIPATING IN MANEUVERS TOOK OFF FROM WATER AND LANDED ON LAND.

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UNCLASSIFIED

AN 0027855

5

UR 9025

AUTHOR-- STEPANOV, V., CAPTAIN 1-ST RANK, PACIFIC FLEET

TITLE-- WE SERVE OUR FATHERLAND

NEWSPAPER-- TRUD, FEBRUARY 22, 1970, P 3, COLS 1-6

ABSTRACT-- THE ARTICLE DESCRIBES LIFE ON THE ROCKET MISSILE CRUISER THE "ADMIRAL-FOKIN". DURING ITS INDIAN OCEAN VOYAGE, THE CRUISER COVERED 50,000 KM AND VISITED SEVEN COUNTRIES.

A PHOTOGRAPH OF THE CRUISER, WITH MARKING "641", IS GIVEN.

*sn*

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19671139

USSR

UDC 621.791.72:621.9-536.546.621

BONDAREV, A. A., VOROPAY, N. M., RABKIN, D. M., Ye. O. Paton Electric Welding  
Institute, STEPANOV, V. F., POSTNIKOV, V. P., Moscow Oblast

"Cathode Ray Welding of Spherical Containers of Aluminum Alloys"

Kiev, Avtomaticheskaya Svarka, No 5, May 1972, pp 44-47

Abstract: The features of cathode ray welding of vacuum tight joints were studied as applicable to spherical containers of AMG5 and D20-1 aluminum alloys. Welded joints produced at the optimal welding modes showed no pores, cracks or other defects. The  $\beta$  phase was finely and evenly dispersed. In contrast to argon-arc welding, the near-seam zone had practically no areas of recrystallization with enlarged base-metal grains. The mechanical properties of joints produced by cathode ray welding were universally superior to those produced by argon-arc welding. The stability of the results of mechanical tests was high; the strength factor of the joints was greater than with argon-arc welding.

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USSR

UDC 621.365.82

ZABORTSEVA, T. A., STEPANOV, A. F., STEPANOV, V. A.

"Evaluation of the Modal Composition of Radiation from Gas Lasers Using the Spatial Coherence Function"

Tr. Ryazan. Radiotekhn. in-ta (Proceedings of the Ryazan' Radiotechnical Institute), No 37, 1972, pp 56-62 (RZh-Fizika, No 9, Sep 73, Abstract No 9D810

Translation: The spatial coherence function of gas laser radiation  $|\gamma_{12}|^x$  was studied experimentally in a Young interferometer for two experimental geometries (symmetrical and asymmetrical). The object of the investigation was an Ar laser ( $\lambda = 514.5$  nanometers) with a confocal resonator (base about 0.8 meters), the control of the oscillation mode being achieved by alignment of the resonator mirror. It was shown that  $|\gamma_{12}|^x$  functions can be used to calculate the ratio of power of the generated modes, with the values the same in the two geometries. For two lines of a He-Ne laser (632.8 and 640.1 nanometers) the distribution of energy in cross-sections of the beam in the near zone and the spatial coherence functions  $|\gamma_{12}|^x$  were studied as the length of the resonator approached the critical ( $R_1 = \infty$ ,  $R_2 = 1$  meter,  $L \rightarrow 1$  meter). It was shown that the  $|\gamma_{12}|^x$  functions give more accurate information

USSR

ZABORTSEVA, T. A., et al., Tr. Ryazan. Radiotekhn. in-ta, No 37, 1972, pp 56-62  
about the modal composition of the radiation than data on the distribution of  
energy in the cross-section of the beam. Seven bibliographic citations. V.I.R.

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1

USSR

UDC 621.373.530.145.6

DYATLOV, M. K., MAL'KOVA, G. I., NOVIKOVA, V. A., STEPANOV, V. A.,  
SUKHANOVA, G. A.

"Service Life of a Helium-Cadmium Laser"

Elektron. tekhnika. Nauch.-tekhn. sb. Gazorazrjadn. pribory (Electronic  
Technology. Scientific and Technical Collection. Gas-Discharge Devices),  
1971, vyp. 1(21), pp 77-85 (from RZh-Radiotekhnika, No 7, Jul 71,  
Abstract No 7D134)

Translation: Processes are studied which affect the service life of a  
helium-cadmium laser with emission on a wavelength of 4416 Å. It is  
shown that the principal cause for termination of the service life of  
this laser is the sorption of helium as cadmium vapor condenses from  
the discharge onto the cold sections of the discharge tube. Résumé.

1/1

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USSR

UDC: 519.281

STEPANOV, V. A., SOPIN, I. A.

"Modified Kolmogorov Operator in Identification Problems"

V sb. Tekhn. kibernetika. Vyp. 15 (Technical Cybernetics--collection of works. No 15), Kiev, 1970, pp 54-57 (from RZh-Kibernetika, No 7, Jul 71, Abstract No TV334)

Translation: A sequential heuristic procedure for selecting the most informative terms of an approximating polynomial called a modified Kolmogorov operator is considered as applied to problems of identification of a control system. The informative usefulness of the terms is determined from the maximum negative increment of residual variance of the identification. Assuming good conditioning, the operator of all possible associations of paired combinations of variables has the highest rate of convergence. G. Semenov.

1/1

USSR

UDC: 621.373:530.145.6

OSTAPCHENKO, Ye. P., STEPANOV, V. A.

"Emission Spectrum of Gas Lasers and Time Coherence"

Elektron. tekhnika. Nauchno-tekhn. sb. Gazorazryadn. pribory (Electronic Technology. Scientific and Technical Collection. Gas-Discharge Devices), 1970, vyp. 2(18), pp 16-19 (from RZh-Radiotekhnika, No 11, Nov 70, Abstract No 11B267)

Translation: An expression is derived for the function of coherence of emission from gas lasers operating in the state of pure transverse modes with simultaneous emission of several lines. A brief analysis is given of time coherence for a simplified model of emission, and possibilities are pointed out for using the coherence function to derive information on the spectrum of generated frequencies.

1/1

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1/2 030

TITLE--CREEP OF METALS IN TENSION AND COMPRESSION

UNCLASSIFIED

PROCESSING DATE--04DEC70

-U-

AUTHOR--(02)-STEPANOV, V.A., SHPEYSMAN, V.V.

COUNTRY OF INFO--USSR

SOURCE--FIZIKA METALLOV I METALLOVEDENIE, FEB. 1970, 29, (2), 375-380

DATE PUBLISHED----FEB70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--CREEP MECHANISM, TENSILE STRESS, COMPRESSIVE STRESS, LEAD  
ALLOY, COPPER ALLOY, ALUMINUM ALLOY, HIGH TEMPERATURE EFFECT

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRA--3002/0337

STEP NO--UR/0126/70/029/002/0375/0380

CIRC ACCESSION NO--AP0129569

UNCLASSIFIED

U30  
CIRC ACCESSION NO--AP0129569  
ABSTRACT/EXTRACT--(U) GP-0-

UNCLASSIFIED

PROCESSING DATE--04DEC70

ABSTRACT. THE RELATION BETWEEN THE CREEP CHARACTERISTICS OF  $\beta$ B, CU, AND AN AL ALLOY UNDER TENSION AND COMPRESSION (AT THE SAME ABS. STRESS) WAS STUDIED. THE STEADY CREEP VELOCITY ATTAINED UNDER COMPRESSION AND TENSION, RESP., DIFFERED MARKEDLY IN EACH CASE. THIS DIFFERENCE WAS ATTRIBUTED TO THE EXISTENCE OF AT LEAST TWO DIFFERENT ATOMIC MECHANISMS CONTROLLING THE CREEP PROCESS, THE RELATION BETWEEN THESE MECHANISMS BEING SENSITIVE TO THE SIGN OF THE APPLIED STRESS. THE DIFFERENCE BETWEEN CREEP IN THE TWO DIRECTIONS WAS GREATEST AT LOW TEMP.; AT HIGH TEMP. ONE OF THE ATOMIC MECHANISMS WAS DOMINANT AND TENSILE AND COMPRESSIVE CREEP WERE MORE SIMILAR.

UNCLASSIFIED

"Second All-Union Biochemical Congress"  
Moscow, Bickniniya, Vol 35, No 2, Mar-Apr 70, pp 425-435

UDC: 577.1

Abstract: The Second All-Union Biochemical Congress was held on 20-28 Oct 69 at Tashkent under the auspices of the Uzbek Department of the All-Union Biochemical Society. Symposia on evolutionary biochemistry, the connection between the structure and functions of proteins, the biosynthesis of proteins, the biochemistry of membranes, biological oxidation, the functional biochemistry of cell structures, the regulation of enzymatic processes, the structure and function of muscles, and other subjects were conducted. The introductory lecture, which dealt with the evolutionary aspects of nucleic acids, was given by A. M. BELIKOVICH (Moscow). A leading report in the symposium on evolutionary biochemistry was presented by A. I. OFARIN (Moscow), who discussed theories and experimental results pertaining to the origin of life on earth. A report by V. A. STEPANOV (Moscow) dealt with the evolution of protein enzymes. In the symposium on the structure of proteins, A. A. BAYEV (Moscow) reported the results of work on the structure of various t-RNA and the properties of molecular fragments of valine t-RNA. In the course of this work, for which a State Prize was awarded, the succession of nucleotides in the valine t-RNA chain was fully clarified. A paper by L. I. ELISAVITA

1/4  
in Siberia yields ...  
nucleases in the treatment of virus diseases ...  
on the biochemistry of membranes, P. G. KOSTAYUK (Kiev) in ...  
the transfer of ions in connection with the generation of excitation potentials  
by nerve cells expressed the opinion that the action of nerve impulse transmitters



1/2 034 UNCLASSIFIED PROCESSING DATE--18SEP70  
TITLE--AT THE OKEAN MANEUVERS -U-  
AUTHOR--STEPANOV, V. S  
COUNTRY OF INFO--USSR  
SOURCE--PRAYDA UKRAINY, APRIL 23, 1970, P 4 COLS 1-5  
DATE PUBLISHED--23APR70  
SUBJECT AREAS--MILITARY SCIENCES, AERONAUTICS, MECH., IND., CIVIL AND  
MARINE ENGR  
TOPIC TAGS--AMPHIBIAN AIRCRAFT, WAR GAMES, MILITARY TRAINING, BUOY,  
ANTISUBMARINE WARFARE, SUBMARINE DETECTION  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--1985/0072 STEP NO--UR/9013/70/000/000/0004/0004  
CIRC ACCESSION NO--AN0100631  
UNCLASSIFIED

2/2 034 UNCLASSIFIED PROCESSING DATE--18SEP70  
CIRC ACCESSION NO--AN0100631  
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. AMPHIBIAN AIRCRAFT PARTICIPATED IN  
ASW. DETECTION IS BY MEANS OF BUOYS DROPPED FROM THE AIRCRAFT AND ACT  
AS LISTENING DEVICES BY RADIO TRANSMISSION OF THE RADIO OPERATOR ON THE  
AMPHIBIAN. THE AMPHIBIAN MAY DROP TORPEDOES OR TRANSMIT INFORMATION  
ELSEWHERE. THE AMPHIBIAN PARTICIPATING IN MANEUVERS TOOK OFF FROM WATER  
AND LANDED ON LAND.

UNCLASSIFIED

89

AN 0027855

UR 9015

AUTHOR-- STEPANOV, V., CAPTAIN 1-ST RANK, PACIFIC FLEET

TITLE-- WE SERVE OUR FATHERLAND

NEWSPAPER-- TRUD, FEBRUARY 22, 1970, P 3, COLS 1-5

ABSTRACT-- THE ARTICLE DESCRIBES LIFE ON THE ROCKET MISSILE CRUISER THE "ADMIRAL-FOKIN". DURING ITS INDIAN OCEAN VOYAGE, THE CRUISER COVERED 50,000 KM AND VISITED SEVEN COUNTRIES.

A PHOTOGRAPH OF THE CRUISER, WITH MARKING "641", IS GIVEN.

13671139

USSR

UDC 621.791.72:621.9-536.546.621

BONDAREV, A. A., VOROPAY, N. M., RABKIN, D. M., Ye. O. Paton Electric Welding  
Institute, STEPANOV, V. F., POSTNIKOV, V. P., Moscow Oblast

"Cathode Ray Welding of Spherical Containers of Aluminum Alloys"

Kiev, Avtomaticheskaya Svarka, No 5, May 1972, pp 44-47

Abstract: The features of cathode ray welding of vacuum tight joints were studied as applicable to spherical containers of AMG6 and D20-1 aluminum alloys. Welded joints produced at the optimal welding modes showed no pores, cracks or other defects. The  $\beta$  phase was finely and evenly dispersed. In contrast to argon-arc welding, the near-seam zone had practically no areas of recrystallization with enlarged base-metal grains. The mechanical properties of joints produced by cathode ray welding were universally superior to those produced by argon-arc welding. The stability of the results of mechanical tests was high; the strength factor of the joints was greater than with argon-arc welding.

1/1

UDC 621.365.82

USSR

ZABORTSEVA, T. A., STEPANOV, A. F., STEPANOV, V. A.

"Evaluation of the Modal Composition of Radiation from Gas Lasers Using the Spatial Coherence Function"

Tr. Ryazan. Radiotekhn. in-ta (Proceedings of the Ryazan' Radiotechnical Institute), No 37, 1972, pp 56-62 (RZh-Fizika, No 9, Sep 73, Abstract No 9D810)

Translation: The spatial coherence function of gas laser radiation  $|\gamma_{12}| \times$  was studied experimentally in a Young interferometer for two experimental geometries (symmetrical and asymmetrical). The object of the investigation was an Ar laser ( $\lambda = 514.5$  nanometers) with a confocal resonator (base about 0.8 meters), the control of the oscillation mode being achieved by alignment of the resonator mirror. It was shown that  $|\gamma_{12}| \times$  functions can be used to calculate the ratio of power of the generated modes, with the values the same in the two geometries. For two lines of a He-Ne laser (632.8 and 640.1 nanometers) the distribution of energy in cross-sections of the beam in the near zone and the spatial coherence functions  $|\gamma_{12}| \times$  were studied as the length of the resonator approached the critical ( $R_1 = \infty$ ,  $R_2 = 1$  meter,  $L \rightarrow 1$  meter). It was shown that the  $|\gamma_{12}| \times$  functions give more accurate information

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USSR

ZABORTsEVA, T. A., et al., Tr. Ryazan. Radiotekhn. in-ta, No 37, 1972, pp 56-62

about the modal composition of the radiation than data on the distribution of energy in the cross-section of the beam. Seven bibliographic citations. V.I.R.

2/2

- 16 -

USSR

UDC 621.373:530.145.6

DYATLOV, M. K., MAL'KOVA, G. I., NOVIKOVA, V. A., STEPANOV, V. A.,  
SUKHANOVA, G. A.

"Service Life of a Helium-Cadmium Laser"

Elektron. tekhnika. Nauch.-tekhn. sb. Gazorazryadn. pribory (Electronic  
Technology. Scientific and Technical Collection. Gas-Discharge Devices),  
1971, vyp. 1(21), pp 77-85 (from RZh-Radiotekhnika, No 7, Jul 71,  
Abstract No. 7DL34)

Translation: Processes are studied which affect the service life of a  
helium-cadmium laser with emission on a wavelength of  $4416 \text{ \AA}$ . It is  
shown that the principal cause for termination of the service life of  
this laser is the sorption of helium as cadmium vapor condenses from  
the discharge onto the cold sections of the discharge tube. Resumé.

1/1

- 70 -

USSR

UDC: 519.281

STEPANOV, V. A., SOPIN, I. A.

"Modified Kolmogorov Operator in Identification Problems"

V sb. Tekhn. kibernetika. Vyp. 15 (Technical Cybernetics--collection of works. No 15), Kiev, 1970, pp 54-57 (from RZh-Kibernetika, No 7, Jul 71, Abstract No TV334)

Translation: A sequential heuristic procedure for selecting the most informative terms of an approximating polynomial called a modified Kolmogorov operator is considered as applied to problems of identification of a control system. The informative usefulness of the terms is determined from the maximum negative increment of residual variance of the identification. Assuming good conditioning, the operator of all possible associations of paired combinations of variables has the highest rate of convergence. G. Semenov.

1/1



USSR

UDC: 621.373:530.145.6

OSTAPCHENKO, Ye. P., STEPANOV, V. A.

"Emission Spectrum of Gas Lasers and Time Coherence"

Elektron. tekhnika. Nauchno-tekhn. sb. Gazorazryadn. pribory (Electronic Technology. Scientific and Technical Collection. Gas-Discharge Devices), 1970, vyp. 2(18), pp 16-19 (from RZh-Radiotekhnika, No 11, Nov 70, Abstract No 11D267)

Translation: An expression is derived for the function of coherence of emission from gas lasers operating in the state of pure transverse modes with simultaneous emission of several lines. A brief analysis is given of time coherence for a simplified model of emission, and possibilities are pointed out for using the coherence function to derive information on the spectrum of generated frequencies.

1/1

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1/2 030 UNCLASSIFIED PROCESSING DATE--04DEC70  
TITLE--CREEP OF METALS IN TENSION AND COMPRESSION -U-  
AUTHOR--(02)-STEPANOV, V.A., SHPEYSMAN, V.V. S  
COUNTRY OF INFO--USSR  
SOURCE--FIZIKA METALLOV I METALLOVEDENIE, FEB. 1970, 29, (2), 375-380  
DATE PUBLISHED----FEB70  
SUBJECT AREAS--MATERIALS  
TOPIC TAGS--CREEP MECHANISM, TENSILE STRESS, COMPRESSIVE STRESS, LEAD  
ALLOY, COPPER ALLOY, ALUMINUM ALLOY, HIGH TEMPERATURE EFFECT  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAE--3003/0337 STEP NO--UR/0126/70/029/002/0375/0380  
CIRC ACCESSION NO--AP0129569  
UNCLASSIFIED

2/2 030

UNCLASSIFIED

PROCESSING DATE--04DEC70

CIRC ACCESSION NO--AP0129569

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE RELATION BETWEEN THE CREEP CHARACTERISTICS OF PB, CU, AND AN AL ALLOY UNDER TENSION AND COMPRESSION (AT THE SAME ABS. STRESS) WAS STUDIED. THE STEADY CREEP VELOCITY ATTAINED UNDER COMPRESSION AND TENSION, RESP., DIFFERED MARKEDLY IN EACH CASE. THIS DIFFERENCE WAS ATTRIBUTED TO THE EXISTENCE OF AT LEAST TWO DIFFERENT ATOMIC MECHANISMS CONTROLLING THE CREEP PROCESS, THE RELATION BETWEEN THESE MECHANISMS BEING SENSITIVE TO THE SIGN OF THE APPLIED STRESS. THE DIFFERENCE BETWEEN CREEP IN THE TWO DIRECTIONS WAS GREATEST AT LOW TEMP.; AT HIGH TEMP. ONE OF THE ATOMIC MECHANISMS WAS DOMINANT AND TENSILE AND COMPRESSIVE CREEP WERE MORE SIMILAR.

UNCLASSIFIED

USSR

UDC: 577.1

"Second All-Union Biochemical Congress"

Moscow, Biokhimiya, Vol 35, No 2, Mar-Apr 70, pp 425-435

Abstract: The Second All-Union Biochemical Congress was held on 20-28 Oct 69 at Tashkent under the auspices of the Uzbek Department of the All-Union Biochemical Society. Symposia on evolutionary biochemistry, the connection between the structure and functions of proteins, the biosynthesis of proteins, the biochemistry of membranes, biological oxidation, the functional biochemistry of cell structures, the regulation of enzymatic processes, the structure and function of muscles, and other subjects were conducted. The introductory lecture, which dealt with the evolutionary aspects of nucleic acids, was given by A. N. BELOZERSKIY (Moscow). A leading report in the symposium on evolutionary biochemistry was presented by A. I. OPARIN (Moscow), who discussed theories and experimental results pertaining to the origin of life on earth. A report by V. A. STEPANOV (Moscow) dealt with the evolution of protein enzymes. In the symposium on the biosynthesis of proteins, A. A. BAYEV (Moscow) reported the results of work on the structure of various t-RNA and the properties of molecular fragments of valine t-RNA. In the course of this work, for which a State Prize was awarded, the succession of nucleotides in the valine t-RNA chain was fully clarified. A paper by L. L. KISELEVA

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USSR

Biokhimiya, Vol 35, No 2, Mar-Apr 70, pp 425-435

(Moscow) dealt with the role of aminoacyl-t-RNA-synthetases in the synthesis of aminoacyl-t-RNA. t-RNA synthetases specific for methionine, formylmethionine, serine, lysine, and phenylalanine have been identified. A report by R. I. SAGLANIK (Novosibirsk) reviewed work on the suppression of the synthesis of virus nucleic acids by nucleases. Animal experiments showed that administration of DNA-ase prevented the death of mice infected with the viruses of tick-born encephalitis, influenza, and foot-and-mouth disease and made guinea pigs insusceptible for a certain length of time to infection with foot-and-mouth disease. The nucleases did not produce any toxic effects. Application of nucleases in the treatment of human virus diseases showed that they were effective in herpetic keratitis, adenovirus conjunctivitis, tick-born encephalitides, herpes zoster, and other diseases. At present DNA-ase for the treatment of these diseases is being produced industrially. Its application for 4 yrs at major foci of tick-born encephalitis in Siberia yielded very good results. Research is being continued on the use of nucleases in the treatment of virus diseases of farm animals. In the symposium on the biochemistry of membranes, P. G. KOSTRYUK (Kiev) in a report dealing with the transfer of ions in connection with the generation of excitation potentials by nerve cells expressed the opinion that the action of nerve impulse transmitters

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USSR

Biokhimiya, Vol 35, No 2, Mar-Apr 70, pp 425-435

is associated not only with changes in membrane permeability, but also involves a direct effect producing transfer of cations. This was confirmed in a paper by A. A. BOLDYREV (Moscow), who found that acetylcholine inhibited the active transfer of  $Ca^{++}$  in a sarcoplasm reticulum fraction. The inhibition was exerted on ATP-ase, which brings about transfer of  $Ca^{++}$ , and presumably constituted an effect that makes possible the transfer of  $Ca^{++}$  from the reticulum during excitation. Boldyrev pointed out that in view of the localization within muscle cells of the enzymes that regulate acetylcholine metabolism, this effect produced by acetylcholine may be directly related to its functioning as an intracellular regulator of excitation processes. Reports given by members of the Kiev school of biologists (A. V. PALLADIN, O. V. KIRSENKO, G. L. VAVILOVA, M. K. MALYSHEVA, and others) had a bearing on the functioning of Na-K - activated transport ATP-ases in membranes. I. I. IVANOV (Leningrad) found that ATP gelled sarcoplasm proteins of skeletal muscles, whereas  $Ca^{++}$  liquefied the gel that formed. He assumed that a reversible gelation produced in this manner is responsible for the plastic tonus of smooth and striated muscles. In a resolution passed by the Congress, progress in biochemical research was reviewed. It was stated that the membership of the Biochemical Society increased from 3500 to 6500 between the First and Second Congress. Institutes of Proteins, Photosynthesis, and Physiology and Biochemistry

3/4

USSR

Biokhimiya, Vol 35, No 2, Mar-Apr 70, pp 425-435

of Microorganisms were organized within the Academy of Sciences USSR. It was pointed out that it is necessary to conduct more intensive research in several fields including the structure of proteins in relation to their functional activity, biochemical genetics, and (in view of the importance of this field from the standpoint of solution of general problems of biochemistry) the biochemistry of microorganisms and viruses.

4/4

1/2 039  
TITLE--CREEP OF LINEAR UNORIENTED POLYMERS DURING ELONGATION, COMPRESSION,  
AND TORSION--U-  
AUTHOR--(04)--BORSENKO, V.N., PESCHANSKAYA, N.N., SINANI, A.B., STEPANOV,  
V.A.  
COUNTRY OF INFO--USSR  
SOURCE--MEKH. POLIM. 1970, 6(1) 24-8  
DATE PUBLISHED-----70

SUBJECT AREAS--CHEMISTRY, MATERIALS, PHYSICS

TOPIC TAGS--LINEAR POLYMER, ELONGATION, CREEP, POLYMETHYLMETHACRYLATE,  
POLYSTYRENE RESIN, POLYETHYLENE, LOW TEMPERATURE EFFECT, COMPRESSIVE  
STRESS, TORSION STRESS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--1992/0327

STEP NO--UR/0374/70/006/001/0024/0028

ACCESSION NO--AP0111521

UNCLASSIFIED



UNCLASSIFIED

PROCESSING DATE--02OCT70

2/2 039

CIRC ACCESSION NO--AP0111521  
ABSTRACT/EXTRACT--(U) GP-0-

ABSTRACT. THE ELONGATION CREEP RATES OF  
POLY(METHACRYLATE) BETWEEN MINUS 50DEGREES AND PLUS 70DEGREES ARE  
ONLY APPROX. TWICE AS LARGE AS THE COMPRESSION AND TORSIONAL CREEP  
RATES; BELOW MINUS 100DEGREES THE ELONGATION CREEP RATES GREATLY EXCEED  
THE COMPRESSION AND TORSIONAL CREEP RATES. SIMILAR SITUATIONS EXIST  
FOR POLYSTYRENE AND POLYETHYLENE, BUT THE 3 CREEP CURVES NEARLY COINCIDE  
IN THE 60-70DEGREES RANGE FOR POLYSTYRENE AND BELOW MINUS 140DEGREES FOR  
POLYETHYLENE.

UNCLASSIFIED

1/2 024  
UNCLASSIFIED  
TITLE--AMPLITUDE DEPENDENT INTERNAL FRICTION IN ALUMINUM ALLOYS -U-  
PROCESSING DATE--11SEP70  
AUTHOR--CHELNOKOV, V.A., STEPANOV, V.A., KUZMIN, N.L.  
COUNTRY OF INFO--USSR  
SOURCE--FIZ. TVERD. TELA 1970, 12(37), 841-7  
DATE PUBLISHED-----70  
SUBJECT AREAS--MATERIALS  
TOPIC TAGS--ALUMINUM ALLOY, METAL INTERNAL FRICTION, ZINC ALLOY, COPPER  
ALLOY, MAGNESIUM CONTAINING ALLOY  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--1988/0647  
STEP NO--UR/0181/70/012/003/0341/0847  
CIRC ACCESSION NO--AP0105626  
UNCLASSIFIED

2/2 024

UNCLASSIFIED

PROCESSING DATE--11SEP70

CIRC ACCESSION NO--AP0105626

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. AMPLITUDE DEPENDENT INTERNAL FRICTION WAS INVESTIGATED IN ALLOYS OF AL WITH MG, CU, AND ZN. MEASUREMENTS OF THE DECREMENT WERE CARRIED OUT AT 300 AND 500 DEGREES K ON THE VIBRATIONAL FREQUENCY OF 400 HZ. INCREASE IN THE CONC. OF THE DOPING ELEMENTS AFFECTS MORE STRONGLY, THE DECREMENT MEASURED AT INCREASING AMPLITUDE OF THE VIBRATIONS THAN ON THE DECREMENT MEASURED AT DECREASING AMPLITUDE. THIS LEADS TO THE APPEARANCE OF HYSTERESIS OF THE DECREMENT WHICH INCREASES WITH INCREASING DEGREE OF DOPING AND DECREASES WITH INCREASING TEMP. OF TESTING. A MODEL IS PROPOSED FOR EXPLAINING THE EXPTL. DATA IN WHICH IT IS ASSUMED THAT DISLOCATIONS IN ANNEALED AL ALLOYS ARE FIXED BY STRONG ATMS. OF IMPURITIES AND FOR SMALL STRESSES ARE IMMOBILE. AMPLITUDE DEPENDENT INTERNAL FRICTION APPEARS WHEN THE DISLOCATIONS ARE PICKED OUT OF THE ATMS. AFTER THIS PROCESS THE ATM. IS DESTROYED AND THEN THE AMPLITUDE DEPENDENT INTERNAL FRICTION IS DETD. ONLY BY THE INTERACTION OF VIBRATING DISLOCATION SEGMENTS WITH UNIFORMLY DISTRIBUTED IMPURITY ATOMS OF THE SOLID SOLN. THE MODEL PROPOSED MAKES IT POSSIBLE TO CALC., FROM THE AMPLITUDE DEPENDENCE OF THE INTERNAL FRICTION, THE CRIT. SLIDING STRESS. THE DATA OBTAINED BY MEANS OF THE CALC. COINCIDE WITH THE EXPTL. RESULTS FOR AL-ZN AND AL-CU ALLOYS.

UNCLASSIFIED

USSR

UDC 621.397

S  
STEPANOV, V. A.

"Vertical Sharpness of Transformed Image in Asynchronous Discretization of a Television Signal"

Dokl. Nauchno-tekhn. konferentsii po itogam nauchno-issled. rabot za 1968-1969 gg. Mosk. energ. in-t, 1970. Sekts. radiotekhn. Podseks. televiz. (Reports of the Scientific-Engineering Conference on Advances in Scientific-Research Studies in 1968-1969, Moscow Energetics Institute 1970. Section on Radio Engineering. Subsection on Television), Moscow, 1969, pp 144-151 (from RZh-Radiotekhnika, No 2, Feb 70, Abstract No 2G198)

Translation: In television applications use is made of the so-called "conjugate TV systems," in which the image obtained with the aid of a broadband transmitting camera with interleaved scan is transmitted over a narrowband communications channel. This signal processing without the use of special measures results in 1/2

USSR

STEPANOV, V. A., Dokl. Nauchno-tekhn. konferentsii po itogam nauchno-issled. rabot za 1968-1969 gg. Mosk. energ. in-t, 1970. Sekts. radiotekhn. Podseks. televid, 1969, pp 144-151 (from RZh-Radiotekhnika, No 2, Feb 70, Abstract No 2G198)

at least a two-fold loss of vertical image sharpness. There are two ways to retain the original vertical sharpness in the conjugate systems. One way involves use at the receiving end of high frequency scans of the original standard. The other way amounts to the use at the output of the narrowband communications line of a video control device based on a memory tube with visible image. The image scan on the screen of this tube must be accomplished in-sync and in-phase with the asynchronous discretization of the broadband signal at the transmitting end. M.T.

2/2

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US33

Biochimica, Vol. 35, No. 2, Mar-Apr 70, pp 125-135

of Microorganisms were organized within the Academy of Sciences USSR. It was pointed out that it is necessary to conduct more intensive research in several fields including the structure of proteins in relation to their functional activity, biochemical genetics, and (in view of the importance of this field from the standpoint of solution of general problems of biochemistry) the biochemistry of microorganisms and viruses.

L/A

2/2 039

UNCLASSIFIED

PROCESSING DATE--02OCT70

CIRC ACCESSION NO--AP0111521

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE ELONGATION CREEP RATES OF POLY(METHACRYLATE) BETWEEN MINUS 50DEGREES AND PLUS 70DEGREES ARE ONLY APPROX. TWICE AS LARGE AS THE COMPRESSION AND TORSIONAL CREEP RATES; BELOW MINUS 100DEGREES THE ELONGATION CREEP RATES GREATLY EXCEED THE COMPRESSION AND TORSIONAL CREEP RATES. SIMILAR SITUATIONS EXIST FOR POLYSTYRENE AND POLYETHYLENE, BUT THE 3 CREEP CURVES NEARLY COINCIDE IN THE 60-70DEGREES RANGE FOR POLYSTYRENE AND BELOW MINUS 140DEGREES FOR POLYETHYLENE.

UNCLASSIFIED

1/2 024 UNCLASSIFIED PROCESSING DATE--11SEP70  
TITLE--AMPLITUDE DEPENDENT INTERNAL FRICTION IN ALUMINUM ALLOYS -U-

AUTHOR--CHELNOKOV, V.A., STEPANOV, V.A., KUZMIN, N.L.

COUNTRY OF INFO--USSR

SOURCE--FIZ. TVERD. TELA 1970, 12(3), 841-7

DATE PUBLISHED-----70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--ALUMINUM ALLOY, METAL INTERNAL FRICTION, ZINC ALLOY, COPPER  
ALLOY, MAGNESIUM CONTAINING ALLOY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--1988/0647

STEP NO--UR/0181/70/012/003/0841/0847

CIRC ACCESSION NO--AP0105626

UNCLASSIFIED



2/2 024

UNCLASSIFIED

PROCESSING DATE--11SEP70

CIRC ACCESSION NO--AP0105626

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. AMPLITUDE DEPENDENT INTERNAL

FRICTION WAS INVESTIGATED IN ALLOYS OF AL WITH MG, CU, AND ZN.

MEASUREMENTS OF THE DECREMENT WERE CARRIED OUT AT 300 AND 500 DEGREES K ON

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DOPING ELEMENTS AFFECTS MORE STRONGLY, THE DECREMENT MEASURED AT

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WITH INCREASING TEMP. OF TESTING. A MODEL IS PROPOSED FOR EXPLAINING

THE EXPTL. DATA IN WHICH IT IS ASSUMED THAT DISLOCATIONS IN ANNEALED AL

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ARE IMMOBILE. AMPLITUDE DEPENDENT INTERNAL FRICTION APPEARS WHEN THE

DISLOCATIONS ARE PICKED OUT OF THE ATMS. AFTER THIS PROCESS THE ATM. IS

DESTROYED AND THEN THE AMPLITUDE DEPENDENT INTERNAL FRICTION IS DETD.

ONLY BY THE INTERACTION OF VIBRATING DISLOCATION SEGMENTS WITH UNIFORMLY

DISTRIBUTED IMPURITY ATOMS OF THE SOLID SOLN. THE MODEL PROPOSED MAKES

IT POSSIBLE TO CALC., FROM THE AMPLITUDE DEPENDENCE OF THE INTERNAL

FRICTION, THE CRIT. SLIDING STRESS. THE DATA OBTAINED BY MEANS OF THE

CALCN. COINCIDE WITH THE EXPTL. RESULTS FOR AL-ZN AND AL-CU ALLOYS.

UNCLASSIFIED

USSR

UDC 621.397

S  
STEPANOV, V. A.

"Vertical Sharpness of Transformed Image in Asynchronous Discretization of a Television Signal"

Dokl. Nauchno-tekhn. konferentsii po itogam nauchno-issled. rabot za 1968-1969 gg. Mosk. energ. in-t, 1970. Sekts. radiotekhn. Podsekt. televiz. (Reports of the Scientific-Engineering Conference on Advances in Scientific-Research Studies in 1968-1969, Moscow Energetics Institute 1970. Section on Radio Engineering. Subsection on Television), Moscow, 1969, pp 144-151 (from RZh-Radiotekhnika, No 2, Feb 70, Abstract No 2G198)

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1/2

USSR

STEPANOV, V. A., Dokl. Nauchno-tekhn. konferentsii po itogam nauchno-issled. rabot za 1968-1969 gg. Mosk. energ. in-t, 1970. Sekts. radiotekhn. Podsekts. televid, 1969, pp 144-151 (from RZh-Radiotekhnika, No 2, Feb 70, Abstract No 2G198)

at least a two-fold loss of vertical image sharpness. There are two ways to retain the original vertical sharpness in the conjugate systems. One way involves use at the receiving end of high frequency scans of the original standard. The other way amounts to the use at the output of the narrowband communications line of a video control device based on a memory tube with visible image. The image scan on the screen of this tube must be accomplished in-sync and in-phase with the asynchronous discretization of the broadband signal at the transmitting end. M.T.

2/2

- 122 -

USSR

UDC: 621.314.2

STEPANOV, V. D., KARETNIKOVA, Ye. I.

"A High-Voltage Piezoceramic Transformer"

USSR Author's Certificate No 277880, filed 16 Dec 68, published 6 Nov 70  
(from RZh-Radiotekhnika, No 6, Jun 71, Abstract No 6V427 P)

Translation: The proposed high-voltage piezoceramic transformer contains input and output sections equipped with electrodes which are located on the opposite sides of piezoceramic plates. As a distinguishing feature of the patent, the transformation ratio is increased and the resonance frequency is raised by making the input section in the form of a stack consisting of the main piezoceramic plate and additional plates fastened to it. The electrodes of a feedback section are placed along with the output section on the two sides of the continuation of the main plate. The input section and feedback section are polarized counter to each other, and the output section consists of two counter polarized segments and is equipped with an end electrode.

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"Multiple-Center Structure of the Spectrum in  $\text{KMgF}_3$  and  $\text{KZnF}_3$  Crystals  
Activated by  $\text{Eu}^{2+}$  and  $\text{Gd}^{3+}$  Ions"

Leningrad, Fizika Tverdogo Tela, Vol 13, No 10, Oct 73, pp 2958-2962

Abstract: The authors analyze the EPR spectra and study the Stark structure of noncubic centers which arise when  $\text{KMgF}_3$  and  $\text{KZnF}_3$  crystals are activated by isoelectronic ions of  $\text{Eu}^{2+}$  and  $\text{Gd}^{3+}$ . The EPR spectra were measured at 9 GHz and 77°K. The constants of the spin Hamiltonian of the ground state of cubic centers of  $\text{Eu}^{2+}$  in the crystals as determined from analysis of the EPR spectra are compared with the parameters of the crystal field of the same centers. A diagram is plotted for Stark splitting of levels  $^6P_{7/2}$  and  $^6P_{5/2}$  for  $\text{Eu}^{2+}$  ions in centers of cubic, tetragonal, and trigonal symmetry, and also for seven active centers of  $\text{Gd}^{3+}$ . The results show indeterminacy of the  $\text{Gd}^{3+}$  ion position.

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"Exchange-Coupled  $Mn^{2+}$  Ion Pairs in  $NaCl$ "

Leningrad, Fizika Tverdogo Tela, Vol 14, No 12, Dec 72, pp 3513-3516

Abstract: The electron paramagnetic resonance method is used to study exchange-coupled pairs of short-range, neighboring, bivalent manganese cations in sodium chloride crystals grown with sulfur dopants. It is shown that this pair is ferromagnetic. The constants of the spin hamiltonian are determined at room temperature for the multiplet with  $S=5$ :  $g=2.004 \pm 0.0005$ ,  $|D| = 0.0259 \pm 0.0001$  T,  $|E| = 0.0029 \pm 5 \cdot 10^{-5}$  T, and  $|A/2| = 0.0042 \pm 0.0002$  T. The variation of line intensity with temperature gives a constant of isotropic exchange interaction  $J = -(63 \pm 17) \text{ cm}^{-1}$ . A model is proposed for compensation of excess charges of the  $Mn^{2+}$  ions.

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UDC: 535.34

ZAVADOVSKAYA, Ye. K., LISITSYN, V. M., BARANOV, A. I., FEDOROV, V. A.,  
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"Radiation-Induced Transformation of Defects in  $\text{CaF}_2$ ,  $\text{SrF}_2$ , and  $\text{BaF}_2$ "

Tomsk, Izvestiya VUZov: Fizika, No 2(129), 1973, pp 110-112

Abstract: The paper presents the results of an investigation of radiation-stimulated processes of transformation of defects in fluorides of alkali-earth metals. The crystals were grown from purified natural fluorides and also from synthesized, chemically pure salts. The crystals were subjected to electron bombardment at 1-1.8 MeV at room temperature and also in a stream of low-temperature plasma at an air pressure of 1-2 mm Hg. The EPR spectra were measured at room temperature on a Thomson-251 spectrometer. It is found that radiation in these crystals converts simple electron defects with active participation of holes to radiation-stable and heat-stable defects. The greatest effect of the radiation-stimulated processes is observed in  $\text{CaF}_2$ .

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Power, Engine, Turbine, Pump

UDC: 621.313.333:538.4

USSR

MERENKOV, Yu. F. and ~~STEPANOV, V. G.~~

"Single-Phase Pump of the Transformer Type With Disc Channel"

Riga, Magnitnaya gidrodinamika, No 2, 1972, pp 103-108

Abstract: In a type of pump of the transformer variety in which the current to the repumped metal is conducted through the transformer without the use of electrodes, the authors solve the electromagnetic field equations for the disc channel and analyze the basic energy characteristics of the pump. A diagram of this disc channel is provided together with a short description of its activity. In their solution of these equations, the authors assumed the following: the liquid metal fills the space between the steel cores, the channel walls being the surface of the cores; the magnetic permeability of the cores is infinite; the magnetic field and the current have single components and the problem is axially symmetrical; the velocity of the liquid metal over the channel cross section is constant for each radius; there are no end effects resulting from the finite dimensions of the cores. Experimental values obtained for the pressure were found to be in close agreement with the computed values, and the same was found to be true for other pump parameters.

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KRUTIKOV, V. F., SILKIN, N. I., and ~~STERANOV, V. G.~~

"EPR Spectra of  $\text{Cd}^+$  Ions in the  $2S_{\frac{1}{2}}$  State in  $\text{K}_2\text{SO}_4$  Crystals"

Leningrad, Fizika Tverdogo Tela, vol. 13, No. 10, October 1971,  
pp 3100-3102

Abstract: This paper investigates the EPR spectra of  $\text{Cd}^+$  ions stabilized by x-rays in the  $2S_{\frac{1}{2}}$  state in  $\text{K}_2\text{SO}_4$  monocrystals. Observations were also made of  $\text{Hg}^+$  EPR spectra in  $\text{K}_2\text{SO}_4$ . However, attempts to observe  $\text{Zn}^+$  ion spectra in the  $\text{K}_2\text{SO}_4$  crystal proved unsuccessful. The crystals with the cadmium impurity were obtained from a water solution through slow evaporation. Those specimens had Cd concentrations of 0.3 to 3%, and their crystals were irradiated by x-rays in a URS-70 equipment with a HSV-2 tube of 50 kv and 15 ma. The spectra measurements were made in the ranges of 3 cm and 8 mm at the temperature of liquid nitrogen. The EPR spectra were obtained at room temperature. It is noted that  $\text{Cd}^+$  EPR spectra were not observed in specimens irradiated at  $77^\circ \text{K}$ . The spectra are reproduced in the article, and a table of spin

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KRUTIKOV, V. F., et al., Fizika Tverdogo Tela, vol. 13, No 10, October 1971, pp 3100-3102

Hamiltonian parameters for paramagnetic centers of  $\text{Cd}^+$  in  $\text{K}_2\text{SO}_4$  is given. Gratitude is expressed to T. B. Bogatova for growing the crystals and to R. Yu. Abdulsabirov and L. A. Trofanchuk for their assistance with the experiment. The authors are associated with the Kazan State University imeni V. I. Ul'yanov-Lenin.

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